

CLAIMS

1. An inspection method for inspecting an internal state of a sample by a measurement of conductive material within an insulating base material formed on the sample,
5 comprising a step of:
 - irradiating ions or electrons upon the surface of the inspection region of said base material; and
 - imaging a surface image of secondary electrons emitted from said surface and from its vicinity;
- 10 etching said inspection region; and
- imaging a surface image successively with secondary electrons emitted from an underlying surface and from its vicinity, renewed successively at the etched depth; and
- measuring said conductive material within said base material based upon accumulated said surface images; and
- 15 inspecting the internal state of said sample.

2. An inspection method according to Claim 1, wherein said surface is etched with an ion beam, and said etching and said imaging of said surface image are performed at the same time.

- 20 3. An inspection method according to Claim 1 or 2, wherein said sample is a SOI wafer, said base material is an embedded silicon oxide layer, and said conductive material is a defect.

- 25 4. An inspection method according to any one of Claims 1 to 3, wherein said sample is

a SOI wafer manufactured by the SIMOX technology.

5. A manufacturing method of a piece for analysis using the inspection method according to any one of Claims 1 to 4, wherein

5 said conductive material within said base material is specified based upon said surface image;

 said base material is etched away, other than a thin film of an analysis region, leaving said base material in the depth direction which constitutes said analysis region, so that said analysis region is formed including at least a portion of specified said
10 conductive material; and

 thereby a piece for analysis having said analysis region is manufactured.

6. An analysis method using a piece for analysis manufactured by the manufacturing method of a piece for analysis according to Claim 5, wherein

15 by observation of said conductive material included in said piece for analysis, the state of said conductive material is analyzed.

7. An analysis method using an inspection method according to any one of Claim 1 to 4, wherein

20 the three dimensional distribution of said conductive material is analyzed from accumulated said surface images.

8. An analyzer used in the analysis method according to Claim 7, comprising:

 a stage upon which said sample is mounted;

25 an ion source producing an ion beam which is irradiated upon said sample;

a beam control device for focusing and scanning the ion beam;

a secondary electron detector which detects secondary electrons emitted from said sample;

a control system which controls the ion source and the beam control device;

5 a imaging system which images the result of detection by said secondary electron detector as said surface image;

and an analyzing device which analyzes the three dimensional distribution of said conductive material from accumulated said surface images.

10 9. A manufacturing method of a SOI wafer using an analysis method according to Claim 6 or 7, wherein
said SOI wafer is manufactured under manufacturing conditions specified by feeding back the state of said conductive material or its three dimensional distribution which has been analyzed.

15 10. A SOI wafer manufactured by the manufacturing method according to Claim 9.